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Roderick Sprague

INCISED DENTALIUM SHELL BEADS IN THE PLATEAU CULTURE AREA

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Whole dentalium and segments of dentalium shell have been used as beads in the Northwest Coast and interior Plateau culture areas both prehistorically and ethnographically. Incised whole shells, and no more than five known examples of incised segments, have been recovered from the Plateau, limited to archaeological contexts. A review of the reported incising clearly shows the use of design elements typical of the Plateau Culture Area as often also used on bone, antler, wood, and historic copper in addition to dentalium. The Asotin site (45-AS-9), one of the few well-dated Plateau burial sites with incised beads indicates that this phenomena has a broad and, as yet, poorly defined chronological occurrence, largely from the protohistoric to the early historic.

INTRODUCTION

The shell popularly called tusk shell, haiqua, hiaqua, hiqua, dentalia, and dentalium is, for the most part, recovered from the waters off of the west coast of Vancouver Island. Other terms in English include tooth shell, Indian tusk shell, horn shell, and Indian money shell. There is also a list of 18 native terms (plus one added in ink by the publisher) as recorded by explorers (Galois and Mackie 1990:3). Of the several species found along the Pacific coast, only *Dentalium pretiosum* Sowerby is found in the Pacific Northwest archaeological record (Erickson 1990:94), however, *D. neohexagonum* is found in coastal California waters (Erlandson et al. 2001). Unlike the Atlantic variety, *D. entails*, the dentalium traded in the West is smooth surfaced thus making it an excellent medium for fine etching or incising and, according to one authority, "scratched" (Clark 1963:18). For a detailed study of the distribution of procurement sites and the various species available, consult the thesis by Barton (1994).

A detailed study of the major species of shell used in the Plateau and their trading routes is provided by Erickson (1990). Other sources for the distribution and trading of dentalium include Andrews (1989), Clark (1963), Galois and Mackie (1990), Mackie and Galois (1990), and Weld (1963). For the Klamath-Modoc region, often included in the Plateau, consult the article by Largaespada (2006). Her study of the archaeological occurrence of marine-shell beads in the Fort Rock Basin within the Oregon portion of the Great Basin revealed almost 200 shell beads of which over half were olivella but only four were dentalium (Largaespada 2006:19). None of the dentalium was incised. Other dentalium in the Great Basin bordering on the Plateau are rare with Bonnichsen (1964:32) the only published source noted in southern Idaho.

The article by Clark (1963), in spite of having the Hidatsa and Gros Ventre speaking Salish in "Dakota Territory," presents good descriptions and illustrations of dentalium procurement equipment. For additional illustrations of shells and procurement equipment, *see* Andrews (1989), Barton (1991:8–9), Underhill (1945:163), Weld (1963:7), and in color, Nuytten (1993). For details on the antiquity of dentalium use, *see* Erlandson et al. (2001).

The term "dentalium" seems to be the preferred term in all situations for malacologists and others studying the animal while anthropologists, especially archaeologists, tend to use the correct Latin forms dentalium for the singular and dentalia for the plural. Of course, for the genus the correct form is *Dentalium*, always capitalized and italicized. The 11th edition of the *Merriam-Webster Collegiate Dictionary* (Mish 2003:333) continues the listing of dentalium with the plural form dentalia. For the benefit of copy editors and the sake of uniformity, the term dentalium will be used exclusively here but the arbitrary statement by Andrews (1989:14) based on one personal communication—"References referring to 'dentalia' in a plural sense are incorrect"—is rejected. Appending the word shell to dentalium, as in the title of this article, is considered redundant by some authorities.

The segmenting and decorating by incising or engraving of dentalium has not been adequately discussed in the literature of the Northwest, neither coastal nor interior. The present discussion will examine the distribution of sites in the Plateau containing shells with these unusual modifications. The important work of Hayden and Schulting (1997:53, 57, 65) makes such a task vastly easier because of their fairly complete listing of sites with incised dentalium. While the

Asotin site is listed as having dentalium, they missed it as having the incised styles. Caution should also be used when locating sites from their map. One interesting fact derived from this work is that all of the incised dentalium they list are from disposals (burials and cremations), a trait also true of Andrews' (1989) listing with the exception of one bead which, according to Andrews, was found by Greengo (1982) in a house excavation. Several other sources such as Osborne (1957) were not instructive as to usage.

The thesis by Andrews (1989) presents extensive information on the distribution of incised dentalium on the Northwest Coast but suffers major deficits for the Plateau. She has created a new cultural area from a physiographic region—the Okanogan Highlands—without a definition and no known previous use of the term in archaeology. Also, for unknown reasons, there is no mention of the extensive use of incised and unincised dentalium on the lower Snake River, yet southern Idaho and the area beyond is included in the discussion. Numerous publications and graduate studies from the lower Snake can be found prior to 1989, including the distribution notations of Erickson (1983).

In spite of these deficiencies, Andrews has a fairly thorough listing of dentalium excavated in the Plateau except those areas just mentioned. In her Table 3, notation is generally made of incised dentalium but numbers are not always available (Andrews 1989:77–84). Where figures are available, of a total of 7,978 beads, only 104 (15 from the Great Basin and California deleted) or 1.3% are incised. The actual number of incised specimens is probably much lower partially because each fragment of a broken incised shell is counted as one bead. For example, the original description of the seven count of Bonnichsen (1964:32) is possibly one and no more than three. Further research seeking more exact figures and comparing the Plateau to the Northwest Coast might yield significant data on incising and segmenting in the two areas. As noted above, only one of the 104 incised specimens was not located in a disposal area (0.96%).

Any study of distribution or statistical manipulation of dentalium data from the Plateau must await the analysis of the numerous minor reports sequestered in the British Columbia Heritage Conservation Branch, Victoria. Some of these reports are virtually impossible to obtain outside of Victoria except for those in a few repositories in microfiche format.

The work at the Asotin burial site (45-AS-9) near Clarkston, Washington (Sprague 1959), made it clear that four cultural forms of dentalium can be found: 1) whole, unincised dentalium (Asotin Type 46) which can be used in an unmodified state since they are naturally open at both ends; 2) whole, incised dentalium (Asotin Type 47) (Figs. 1–3, 5, 6a–b); 3) segmented, unincised (Asotin Type 48); and 4) the rare segmented, incised dentalium (Asotin Type 49) (Figs. 4, 6c). The Asotin burial site is especially significant to the study of Plateau dentalium not only because it contains all four types but because these beads are associated with historic grave goods with comparatively accurate dates, and the burials in the site represent the first and still basic chronology of the Plateau Burial Complex (Sprague 1959, 1967, 1971).

One major problem in the analysis of these bead types is the confusion in the writing of some researchers between broken (accidental) and segmented (intentional) dentalium, neither of which are complete shells. This problem is especially acute in the case of archaeological examples excavated from acidic soil. In every case where segmenting was found on recent samples, the bead still retained the hard shiny surface in contrast to the soft, chalky surface resulting from long burial. This difference is also useful in determining the unethical or even illegal use of archaeological (chalky) beads in modern jewelry reputed to be from ethnographic sources.

In the Plateau, whole beads do not appear to have served as actual money or for the accumulation of wealth as they often did on the Northwest Coast and clearly did in parts of northern California, but rather were more for ornamentation (Spinden 1908:220). Largaespada (2006:6–7), in a brief summary of ethnographic uses of dentalium in the Fort Rock Basin of south-central Oregon, similarly found decorative use preferred over a monetary use. The coast area preferred whole beads while the interior seemed to readily utilize, if not actually desire, the segments. This preference also affected the actual value of the beads as the whole shells were more highly valued closer to the source where the class structure was well developed. In the Plateau the segments were accepted because they were more practical for decoration and their monetary value was of less concern in the more egalitarian interior. It is not known which form was more valued among the Nez Perce at the time of the Asotin burials, but the presence of both is worthy of note. Hayden and Schulting (1997), among others, suggest we need to review the generally held view of the egalitarian Plateau culture. This challenge has recently been met, in part, by Quinn (2006).

The incised lines on the dentalium show a high degree of control in the use of stone tools to make these decorations. The frequency of incising during the late prehistoric, protohistoric, and historic periods suggests that this was a stone tool process that became lost rather than increasing with the introduction of iron and, later, steel tools for reasons we shall see. The patterns are ones typical of the Plateau as found on bone and other materials, even including

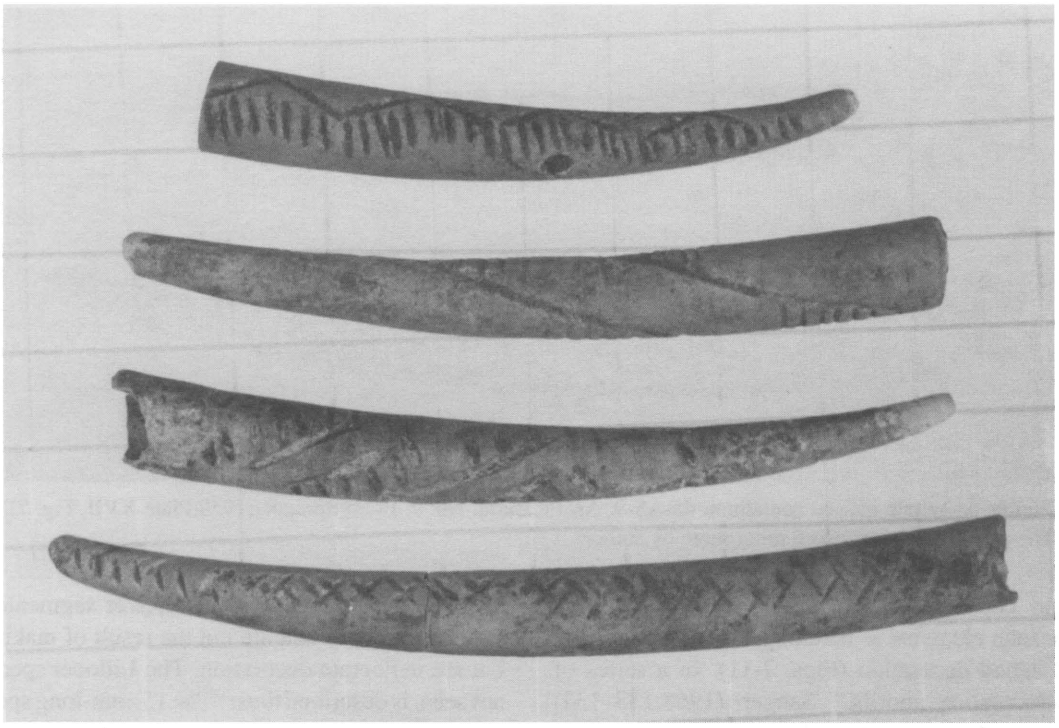

Figure 1. Whole incised dentalium, 45-AS-9, Asotin Burial No. 21. From Sprague (1959:Plate XVII, Fig. 1). The grid squares measure 5 mm (photo by author).

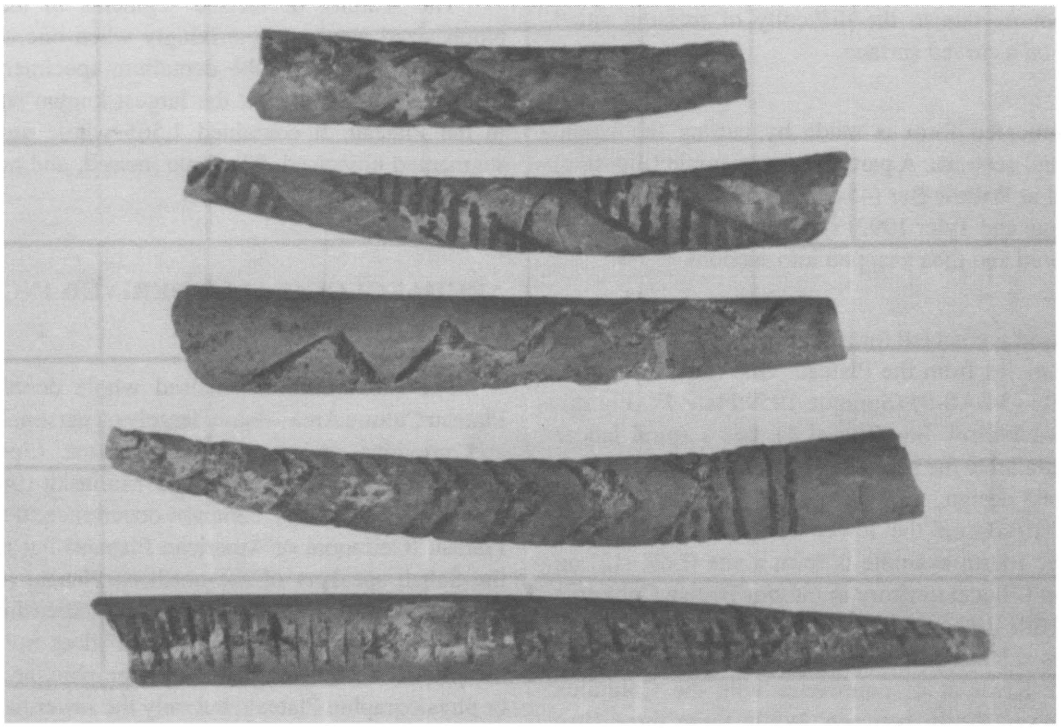

Figure 2. Whole incised dentalium, 45-AS-9, Asotin Burial No. 22. From Sprague (1959:Plate XVII, Fig. 2). The grid squares measure 5 mm (photo by author).

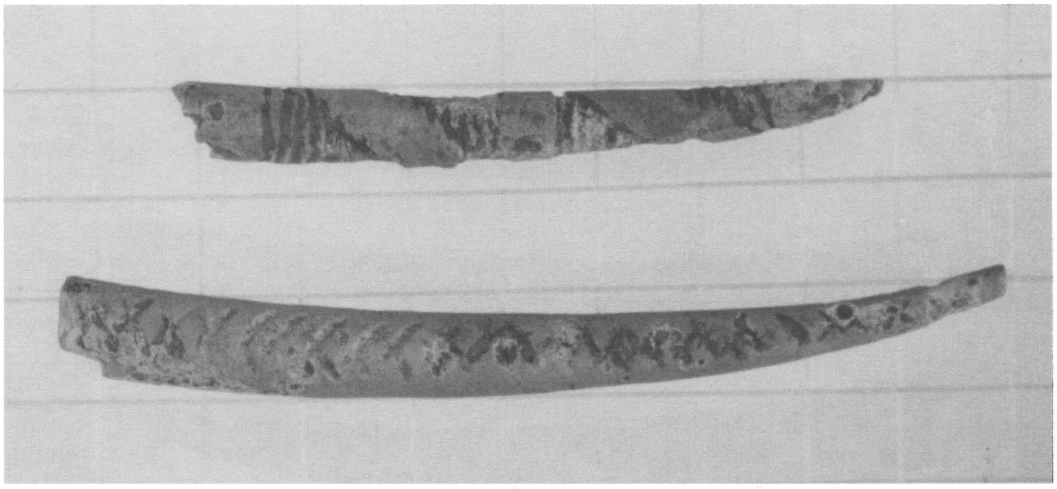

Figure 3. Whole incised dentalium, 45-AS-9, Asotin Burial No. 9. From Sprague (1959:Plate XVII, Fig. 7). The grid squares measure 5 mm (photo by author).

historic-period copper, that lend themselves to incising. They include such elements as hatching, zigzags, chevrons, ladders, and zoned decoration (Figs. 7-11). In a series of "geometric decoration motifs," Sanger (1968:133–134) labels the ladder design as "ticked lines." The surprising thing about Sanger's "Northern Plateau Design Elements" is how little they resemble the dentalium patterns. The circle and dot, a frequent and widely distributed Plateau element, is noticeably absent from the catalogue of incised dentalium designs, probably due to the difficulty of incising small curved lines on a curved surface.

The segmented form is made by cutting the whole shell into small sections. A partially cut example (Fig. 6, c) from a burial at Willow Bar (45-GA-2) on the lower Snake River (Sprague and Tyler 1992) shows how the shells were probably scored and then snapped into sections.

The incised segmented form is quite rare with only four recorded examples from the Plateau. One (Fig. 4) is from the Asotin site (34-AS-9) (Sprague 1959:Plate 17, Fig. 5). Another, from Willow Bar (Burial 4), has a spiral ladder with rungs parallel to the base (Fig. 6, c). The third one, with an undescribed design, was with Burial 39 at the Lawyer site (45-WT-101B) on the lower Snake River (Sprague 1978:31). The fourth example is from a site (EdRl-12) on Seton Lake in Lillooet territory in interior British Columbia (Stryd and Hills 1972). Asotin is at River Mile 146 and Willow Bar is at River Mile 86 as measured from the mouth of the Snake River at its confluence with the Columbia with the Lawyer site in between. While these three sites are located within a 60-mile stretch of the river, the British Columbia site is hundreds of miles to the north.

The designs on the Snake River segmented examples encircle the shell and are not the result of making segments but are deliberate decoration. The Lillooet specimen, while not seen, is described thus: "The 15-mm-long specimen is cut and ground at one end. The medial section is decorated by a single line continuously incised around the circumference of the shell to form a 9-mm-long spiral" (Stryd and Hills 1972:205).

The scarcity of incised segments in the Plateau is emphasized even more strikingly when one considers the relative frequency of the dentalium specimens recovered from the Pot Holes site, the largest known site collection in the Plateau. It contained 1,565 whole unincised, 632 segmented unincised, 83 whole incised, and no segmented incised (Crabtree 1957:97–98).

ARCHAEOLOGICALLY DERIVED INCISED DENTALIUM SOURCES

The distribution of incised whole dentalium in the Plateau Culture Area—based largely on personal observation and previous reviews of the literature (Sprague 1959, 1967, 1971, 1978; Sprague and Mulinski 1980)—reveals a pattern of relatively common occurrence in the southern Plateau (Columbia or American Plateau) but rarity among the Salish speakers of the northern Plateau (Canadian or Fraser Plateau). In spite of recent and increasingly frequent misuse, the term "Columbia Plateau" does ***not***—now or in the past—refer to the whole ethnographic, archaeological, or physiographic Plateau, but only the lower half.

Large-format illustrations of incised dentalium from the Asotin site are reproduced here from Sprague (1959).

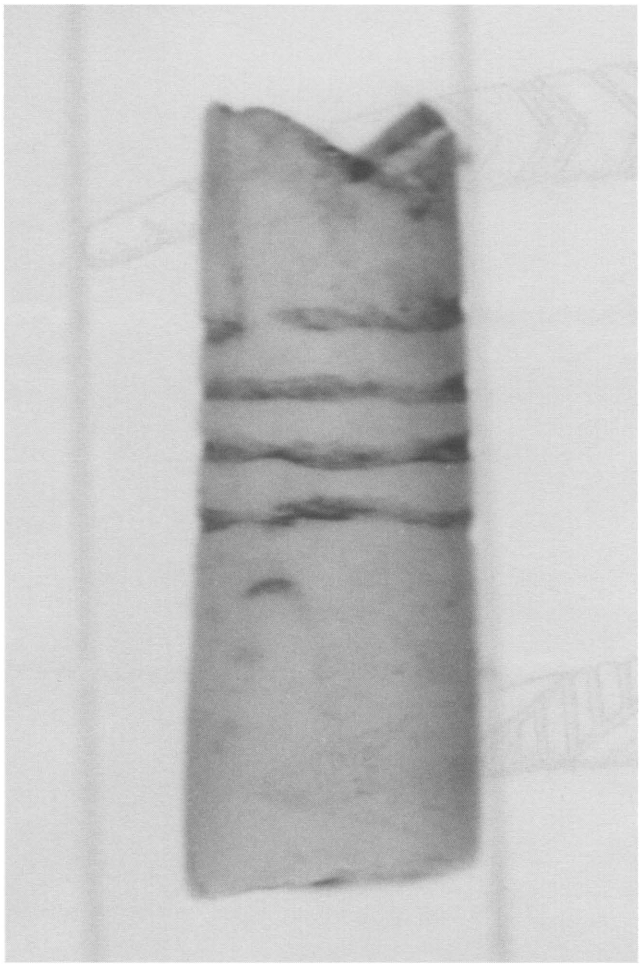

Figure 4. Segmented incised dentalium, 45-AS-9, Asotin Burial No. 15. From Sprague (1959:Plate XVII, Fig. 5). The grid squares measure 5 mm.

Other published illustrations of examples from the southern Columbia Plateau area include the Tucannon site on the left bank of the Snake River a few miles upriver from the Palus site at the confluence of the Palouse and Snake rivers (Iverson 1977:29, 32, Fig. 25); Berrians Island in the McNary Reservoir of the middle Columbia (Osborne 1957:Plate 24b; Shiner 1961:Plate 45); the Yakama (formerly Yakima) territory (Fig. 7, b) (Smith 1910:126, Figs. 117–118); the Pot Holes area, with its typology, in central Washington (Fig. 8) (Crabtree 1957:97–98, Plate 27); and the White Bluffs region on the Columbia River in central Washington (Krieger 1928:137, Fig. 162).

In the northern portion of the Columbia Plateau the published illustrations include the Freeland site on the upper Columbia River (Sprague and Birkby 1970:13, Fig. 7). Illustrated examples even further north, within the Canadian Plateau, include Kamloops (Fig. 7, a) (Smith 1900:431, Fig. 379). The published illustrations in Sprague and Birkby (1970) and Iverson (1977) were all so poor in quality that the original negatives had to be obtained for meaningful comparisons. Photographs in the *Bureau of American Ethnology, Bulletin* series (Osborne 1957; Shiner 1961), were not useful even when the original negatives were examined.

Other references to incised dentalium without illustrations include several on the Snake River upriver (south) of Lewiston, Idaho, across the river from the Asotin site (45-AS-9) and extending down (north) both sides of the Snake River. The Upper Tammany site (10-NP-109) was a badly looted, protohistoric site. Burial No. 12 contained two dentalia, both incised. Burial No. 14, one of the few with integrity, contained 17 dentalium, one of which was incised (Sprague 1978:5).

The Lower (Upper and Lower are based on local topography, not the Snake River) Tammany site (10-NP-110) contained numerous disturbed late prehistoric or protohistoric burials, 45 of which had dentalium in association. The number of dentalium per burial was generally one; however, one burial had 105 with others containing 85, 81, and 61. Seven specimens were incised and divided among four burials. These were Burial No. 16 with two incised, Burials No. 31 and 32 with one incised each, and Burial No. 36 with three incised (Sprague 1978:8–11).

The Asotin burial site (45-AS-9) was dug in 1956 (Sprague 1959) and served as the basis for a Master's thesis. A second phase was excavated in 1972 and has not been fully published. Burial 26 in Area No. 2 had four incised dentalium: one with an incised ladder, straight on one side and zig-zag on the other; one with a ladder without sides with occasional diagonal connectors; and two with zig-zag ladders, sometimes with sides and sometimes without. The Area No. 2 burials were all late prehistoric, or more likely, protohistoric.

The dating of dentalium by historic artifacts at Asotin is less than rewarding in spite of the occurrence of several well-dated artifacts in Area No. 1, as shown in Table 1. The frequency of dentalium at Asotin with such a tightly dated group of artifacts would suggest that the use of dentalium as grave goods lasted well into the historic period and has a strong and well known ethnographic usage, especially on women's dresses (Sprague 1959).

The burials numbered 9 and 10 are the only ones with *terminus post quem* dates and also containing dentalium, and only Burial 9 had incised specimens. Unfortunately, Burial 9 was badly disturbed but the association is reasonably secure. It was oriented east, extended, and apparently contained only buttons as well-dated historic grave goods. Based on

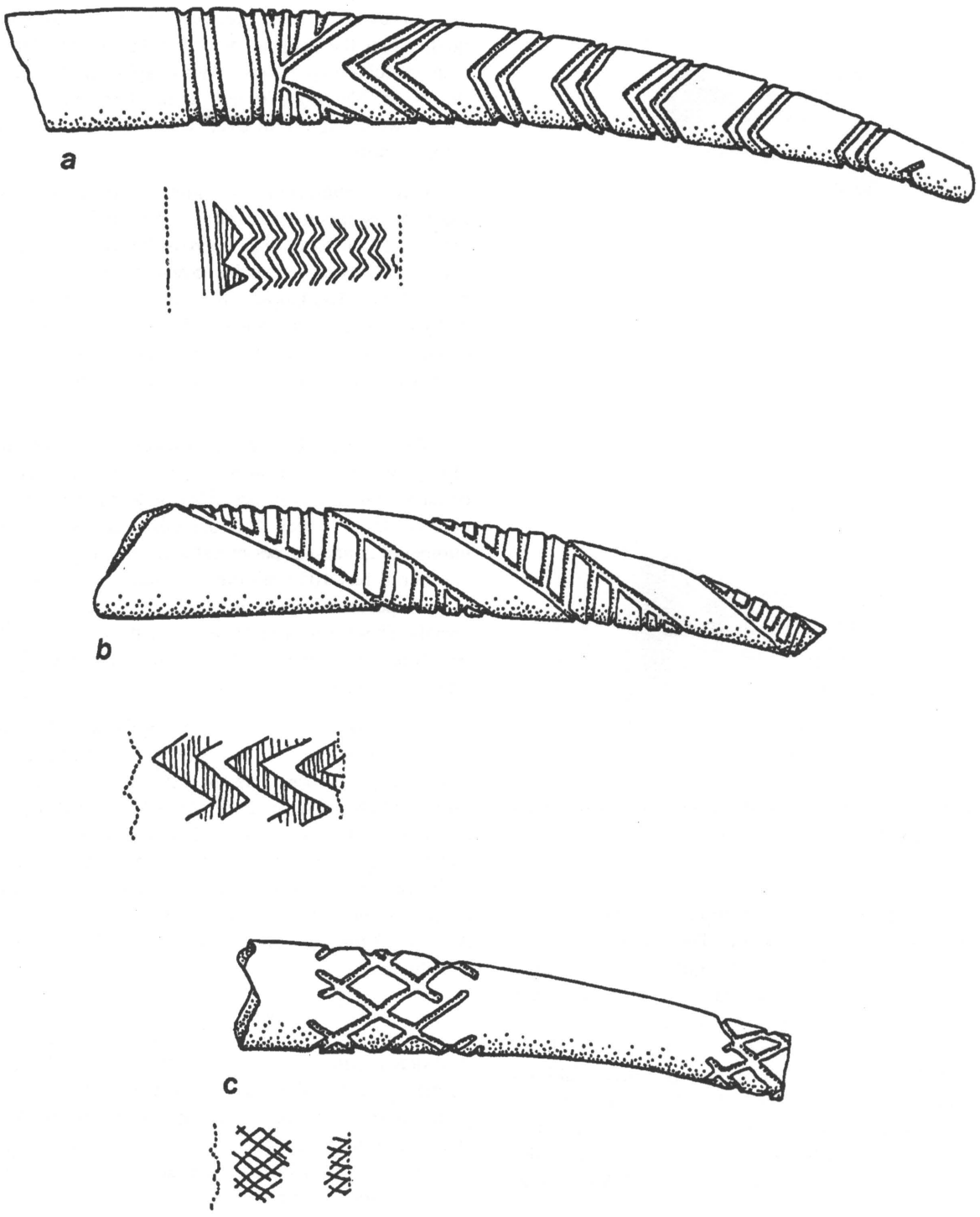

Figure 5. Whole incised dentalium, 45-AS-9, Asotin Burial No. 22: a, 36 mm long; b, 30 mm long; c, 22 mm long (drawing: Catrin Riggs).

previous work in the area (Sprague 1959), this series of traits suggests an early historic non-Christian burial. The Prosser button date of 1840 (Sprague 2002) thus appears to be too late for the date suggested by the series of burial traits.

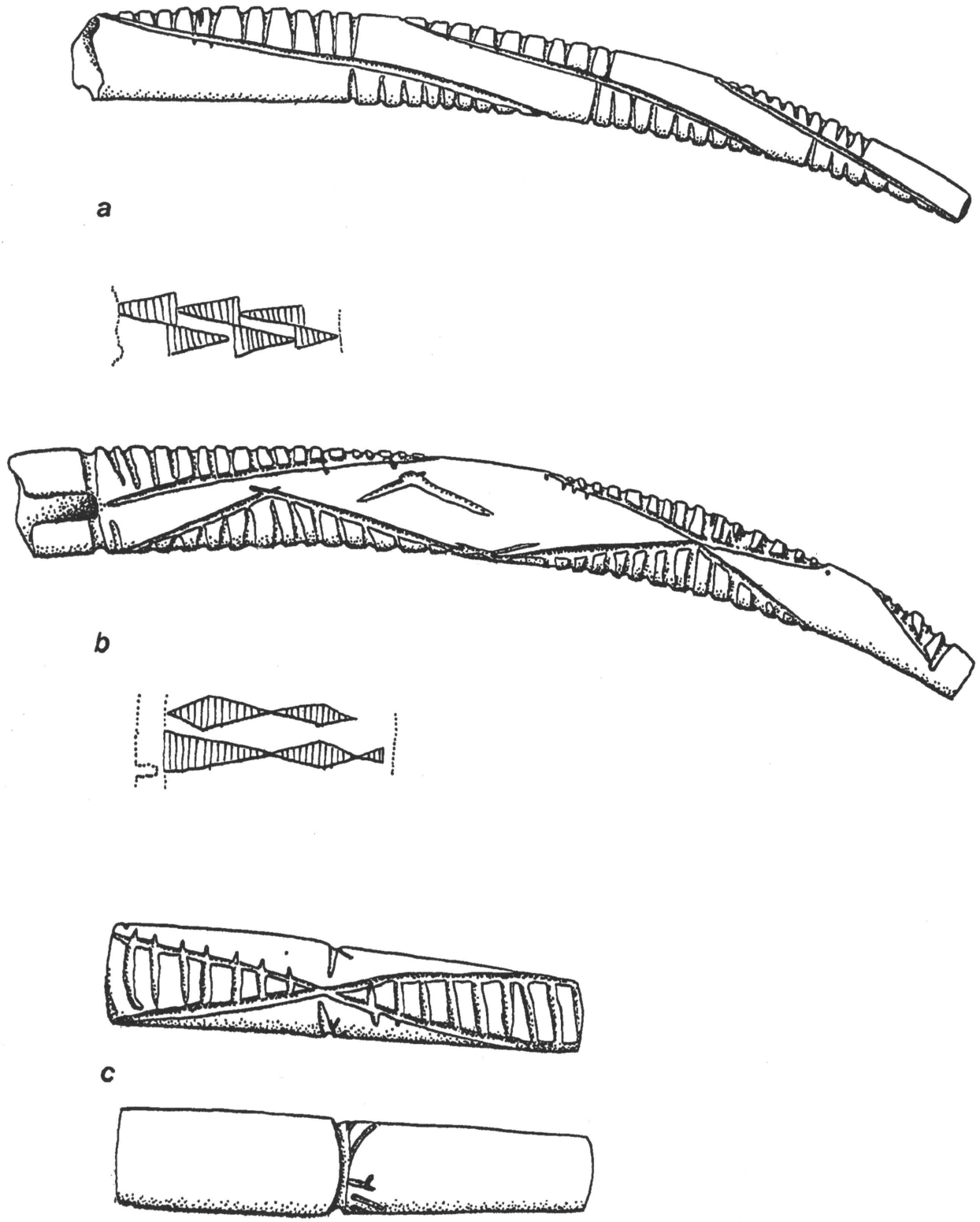

Figure 6. Incised dentalium, 45-AS-9: a, Asotin Burial No. 21, 36 mm long; b, 45-AS-9, Asotin Burial No. 21, 40 mm long; c, 45-GA-2, Willow Bar showing segmenting process, 19 mm long (drawing: Catrin Riggs).

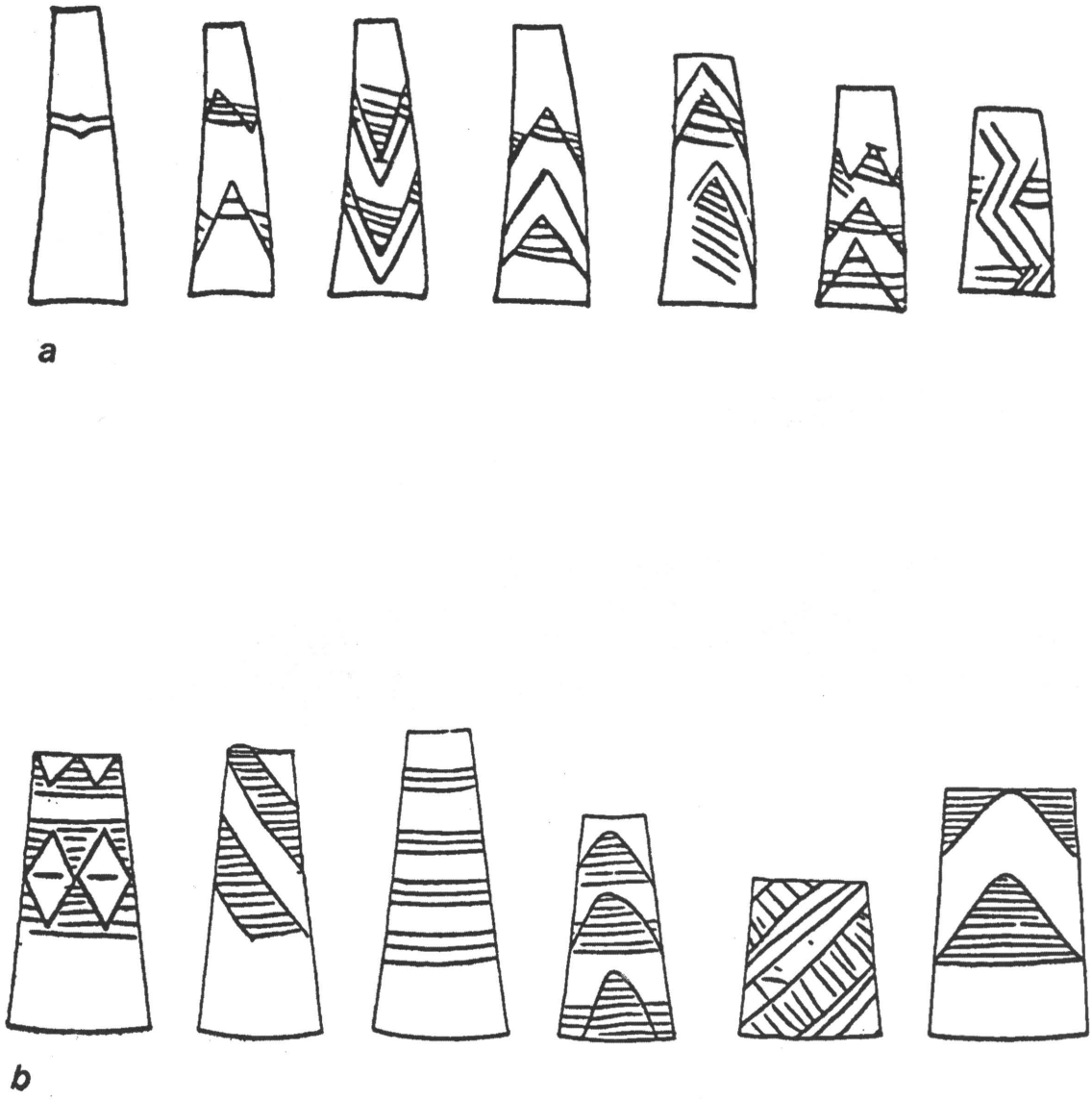

Figure 7. Incised dentalium: a, Kamloops area, after Smith (1900:Fig. 379); b, Yakama area, after Smith (1910:Figs. 117–118) (drawing: Catrin Riggs).

Burial 10 had the greatest number of associated artifacts of any burial excavated professionally at Asotin. The date derived from the associated hawk bell again seems later than the semi-flexed nature and easterly orientation of the burial would suggest. The sprinkling of segmented dentalium in the grave fill has been assumed to be an early trait but this burial would indicate otherwise.

The Lawyer site (45-WT-101B) was excavated on two different occasions. The first phase included several burials with often just one to three dentalium beads (Burials 3, 5, 6, 11, 22, and 33). Burial 34 contained four whole and eight segments and Burial 34A produced four whole ones, one of which was incised "with a zig-zag line, the side of which is intersected by horizontal lines about 1 mm apart" (Rodeffer, Rodeffer, and Sprague 1972:40). This same pattern was found on three of four incised shells in Burial 27. The full description of the dentalium in this burial reads:

> Six dentalia rested on the forward portion of the frontal bone, and one on either side of the skull, slightly above the sphenoid. In addition, twelve fragments were found in association with the upper torso and skull, and two dentalia were recovered from the fill above the burial. Four of the dentalia from the frontal area were decorated with two

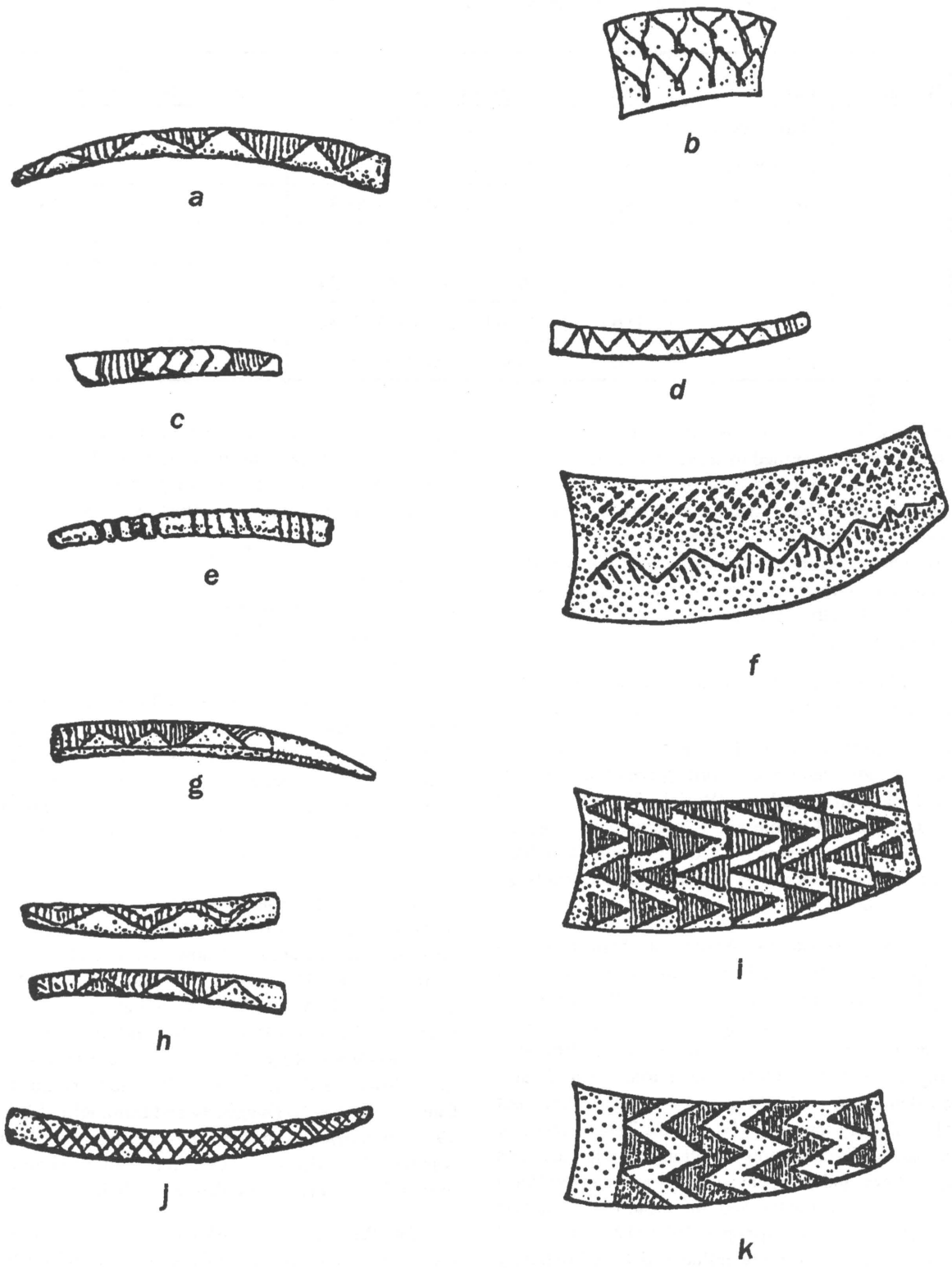

Figure 8. Incised dentalium designs after Crabtree (1957:Plate 27): a, Type 3; b, Type 4; c, Type 2; d, Type 8; e, Type 9; f, Type 5; g, Type 3; h - top, Type 6; h - bottom, Type 3; i, Type 1; j, Type 5; k, Type 7. The arrangement of dentalium and the identification letters are as originally presented in Crabtree. Not to scale (drawing: Catrin Riggs).

Table 1. Dated Artifacts Associated with Burials from 45-AS-9.

Burial	Item	Date	Source of Date	Dentalium		
				Whole	Incised	Segment
8	Hard rubber	1839	Greeley 1872:974–975			
9	Prosser button	1841	Sprague 2002	3	2	
10	Hawk bell	1853	Weatherford 1980:30–31			13
	Token	1856	Sprague 1959:20			
	Bell	1863	Weatherford 1980:33–34			
11	Bell	1863	Weatherford 1980:33–34			
17	Bell	1863	Weatherford 1980:33–34			

different incised patterns. The first, found only on one specimen, was formed by three incisions, spaced not more than 2 mm apart, encircling the shell on the proximal end. The second pattern, represented on three shells, consisted of a vertical zig-zag line, one side of which was intersected by incised horizontal lines spaced 1 mm apart. The latter pattern normally extended the length of the shell (Rodeffer, Rodeffer, and Sprague 1972:37).

For an illustration of this common design element in Nez Perce territory *see* the uppermost example in Fig.1.

The second phase of the Lawyer site (45-WT-101B) uncovered 10 additional protohistoric burials (Nos. 36–45) including four with dentalium (Burials 38, 39, 42, and 44). Included were 18 whole and 62 segmented (Sprague 1978:29-32). One of the rare incised segmented dentalium is recorded as being from Burial 39 but no further details are available (Sprague 1978:31).

The Alpaweyma site (45-AS-81), an historic period Nez Perce village at the mouth of Alpowa (a corruption of Alpaweyma) Creek with strong Christian influence, had a burial area (45-AS-81B) that was badly potted just prior to archaeological recovery for reburial (Rodeffer, Rodeffer, and Sprague 1972:48). Only one burial (Burial 86), contained dentalium—18 whole and 18 fragmented—out of a total of slightly less than 100 burials. The presence of a "sacred package" (containing a sucking tube [a shaman's tool], eagle claws, and a serpent side plate from a Northwest gun among other artifacts) and an easterly orientation (Rodeffer, Rodeffer, and Sprague 1972:112–114) would indicate a person not strongly influenced by Christianity in a predominately Christian site. Most of the burials were contained in wooden boxes or coffins and had a high degree of Christian influence as indicated by westerly orientation and the artifacts. The lack of dentalium in all but one of these late burials perhaps indicates Christian influence against the use of native ornamentation, or perhaps the breakdown of the native trading system, or most likely, both.

An infant burial (Burial No. 6) out of a total of 13 burials at the Alpowa Creek site near the Alpaweyma site had one dentalium in association (Roll 1971:15-16). This site is unquestionably Christian thus adding further evidence to the above conclusion.

The Nisqually John Canyon Talus burial site (45-WT-65B), approximately opposite Alpowa on the east side of the Snake River, was a very early contact site with unique glass trade beads also found at early fur trade period Spokane House (1810-1813) (Sprague 1967:113). Burial 6 contained 20 segmented dentalium but no incised examples (Rodeffer, Rodeffer, and Sprague 1972:11).

Other late prehistoric to protohistoric sites containing unincised dentalium on the middle Snake River, from the Lewiston, Idaho, area and down-river, include: Tammany Talus (10-NP-131), Wilma Bar Silo (45-WT-99), Wilma Bar Bench (45-WT-102), Blyton Landing (45-WT-53B), Knoxway Canyon (45-GA-110), and Wawawai (45-WT-47B) (Rodeffer, Rodeffer, and Sprague 1972). Other sites in the lower Snake River with dentalium included Steptoe Canyon (45-AS-2) (Daugherty and Dammel 1952; Rodeffer 1973). It appears from these sites that segmented dentalium was heavily traded into Nez Perce territory slightly earlier during the late prehistoric than was whole dentalium.

The Willow Bar site (45-GA-2), in addition to the rare incised segment and the only known partially segmented example, had one whole decorated shell with cross-hatching in three segments followed by blank spaces in both directions.

The recovery of dentalium at the Tucannon burial site (45-CO-1B) (Iverson 1977:29-31) opposite the mouth of the Palouse River cannot be considered a valid statistical sample because the site was so severely potted. It yielded 27 whole and 142 segmented dentalium. Four whole beads were incised; two with the typical spiral ladder and two so corroded that the design was unrecognizable.

The middle Snake River burial sites below Asotin Creek and above the Palouse River seem to indicate a dentalium sequence of late prehistoric trading of segmented shells and a slightly later influx of whole dentalia. Incised designs appear to be exclusively placed on fresh, whole shells. With missionary influence and the destruction of the trading systems, the use of dentalium in burials seems to have been replaced by glass trade beads and whole shells were used almost exclusively as ornaments by women on clothing, mostly dresses, and as earbobs and necklaces. This pattern was followed even in spite of nativistic religious dominance at the Palus site near the confluence of the Palouse and Snake rivers where a fully historic cemetery containing 249 individuals had only 12 burials (5%) with dentalium, none of which was incised nor sprinkled in the grave fill (Sprague 1965).

This survey now moves from the Snake River to the far north portion of the Plateau and proceeds south generally following the Fraser and Columbia rivers. North of Lillooet on the Fraser River, Stryd and Hills (1972:205) report that:

> One cut and incised piece of dentalium was collected from the wind blown sands of EeRl-1. The 15-mm-long specimen is cut and ground at one end. The medial section is decorated by a single line continuously incised around the circumference of the shell to form a 9-mm-long spiral.

Site EdRk-7, between Lillooet and Lytton on the Fraser River, produced four undecorated dentalium but "one may have been shortened by scoring and snapping" (Sanger 1970:101). On the Nicola River between Merritt and Spences Bridge, Burial EaRg-2 was recorded with two references to "fragments of incised dentalia beads" (Lawhead 1979). It is assumed that these were fragments of whole incised shells.

Teit (1900:336) described a multiple-grave site at Spuzzum, British Columbia, on the Fraser River north of Hope. It was probably protohistoric in date, with dentalium present. It was found and moved by the Thompson people themselves. Smith (1900:431, Fig. 379) illustrates a series of designs on dentalium recovered from a grave (Fig. 7, a) near Kamloops, British Columbia, on the Southern Fraser River. Smith's perspective of shell shape is distorted.

Burial site EeQw-6, near Chase, British Columbia, on the South Thompson River, contained eight dentalium of which only one was incised (Johnson-Fladmark 1973). No illustration is available.

Barlee (1969a), apparently an amateur archaeologist, reported a potted burial site in Similkameen territory that still contained artifacts including dentalium, blue glass trade beads, and rolled copper beads. One necklace included "135 pieces of dentalia." Some shells from a cremation were incised. It is not clear if this cremation is the same or a different disposal. A crude sketch shows patterns not found at any other Plateau site and are suspect. The same author (Barlee 1969b) reported a burial near Grand Forks, British Columbia, within the Columbia River drainage, with only prehistoric artifacts including "1,742 pieces of dentalia (7 only incised or decorated)." None is described and the difference, if any, between incised and decorated is not explained.

The ethnographic Salish territory of the upper Columbia region—Sanpoil, Nespelem, Colville, Lakes, and Spokan—was surveyed prior to the flooding of Franklin D. Roosevelt Reservoir behind Grand Coulee Dam where numerous dentalium were found and reported (Collier, Hudson, and Ford 1942:92–93). They list an estimated total of 1,140 whole shells and 4,150 segments. Seven whole shells are listed as "incised with transverse lines" but unfortunately none is illustrated. Dentalium were also found in the same area during additional salvage in the late 1960s (Sprague and Birkby1970:13). In this source, Burial 7 at 45-FE-1 is described as having "two carved dentalia segments." If true, and Sprague doubts his own terminology, this would almost double the number of engraved segments recovered in the Plateau. These examples have yet to be located in the Colville Tribal storage facility.

The territory to the south and west of the Lake Roosevelt Region produced very little in the way of incised dentalium, probably because the excavation of burials in that area has not been nearly as extensive as in the surrounding areas. Ironically this was the location of the single incised dentalium found in a house excavation by Greengo (1982).

In Yakama territory, Smith (1910:126, Fig. 117) reported four incised dentalium (Fig. 7, b) from the Tampico burial site. Another three samples came from a cremation pit at the confluence of the Naches and Yakima rivers (Smith 1910:126, Fig. 118).

On the middle Columbia near White Bluffs in what today is within the Hanford Atomic Reservation, Herbert W. Krieger (1928:137, Fig. 162) excavated a series of burials from the late prehistoric. While not described, he does illustrate some examples of "engraved dentalium shells" with typical spiral ladders and hachured triangles.

On the Columbia in the Tri-Cities (Pasco-Kennewick-Richland) area, and down river from the confluence of the Snake and Columbia rivers, there is a gap in our burial data because the evidence here has been very poorly recorded and virtually none of the work in this region has been adequately published. Further down river in the McNary Reservoir the work of Osborne (1957) produced a large number of shells totaling 210 of which 142 were associated with burials and 29 were incised. No indication is given of the designs except that they "are either rows of zigzag lines or single zigzags carrying short hachures perpendicular to the midline of the zigzag." The photographs are so poor as to be of no help (Osborne 1957:108, Plate 24). In contrast to the situation on the lower Snake River, Osborne (1957:108) notes that "There was extensive association of all shells with articles of white manufacture." Based on the proposed reduction of dentalium on the Snake River in the historic period, here we may be seeing less missionary influence (especially in the post-Whitman missionary period) and a greater retention of the shorter trade networks.

Shiner (1961:215) reported dentalium in burials at Berrian's Island (45-BN-3) approximately five miles upstream from McNary Dam with the "astounding" information that "*Dentalium* sp. was strung whole or cut into sections, and some of the shells were incised." Plate 45 tells even less.

Dumond and Minor (1983:184) report incised dentalium from the Wildcat Canyon site in the John Day Reservoir but due to the handicap of excavation prior to their involvement, no descriptions or illustrations were available to them. Strong, Schenck, and Steward (1930:72) state that dentalium "constituted more than half of all the shell artifacts" in The Dalles-Deschutes region, yet no mention is made of incised ones. Incised dentalium illustrated by Emory Strong (1959:196) are from the Buehler collection hence are undoubtedly from the lower Columbia from The Dalles down river to the Portland, Oregon, area. The Oregon Archaeological Society publication, *Screenings* (Buehler1956:1), at a time when it was strictly an amateur effort, has crude and questionable drawings of 11 incised whole dentalium, all with incised ladders spiraling down the shells.

THE POT HOLES TYPOLOGY

The only attempt at a classification of incised dentalium designs is found in the little-known and -used thesis from the University of Washington by Robert Crabtree (1957:98–99) which is based on a cache removed by an amateur. It is also reproduced in the original chart form by Andrews (1989:49). Crabtree's classification is reproduced below with those comments pertaining specifically to the Pot Holes collection (named for a geological land form, not for amateur despoliation). The number in brackets represents the sample size for a total of 81 (or 83) specimens. Crabtree's types included:

Type 1. A series of triangles on each side of the shell, on one side the apex points toward the small end of the shell and on the other side points away. Each triangle is filled in with horizontal lines. The design is on the large half of the shell. [2] [Fig. 8, i - flat perspective].

Type 2. A series of encircling chevrons, the top one (at the smaller end) and the bottom one being filled with horizontal hachure. The chevrons are based on an encircling triangle, also with horizontal hachure. The apex of the triangle is toward the smaller end. This design includes approximately three-fourths of this one shell. [1] [Fig. 8, c].

Type 3. A zigzag line with perpendicular hachure, generally on both sides of the shell. [65] [The most common (80%) design in the Pot Holes collection; Fig. 8, a, g, h - lower].

Type 4. This design consisted of a series of converging lines. [3] [Crabtree recommends seeing the drawing; Fig. 8, b - flat perspective].

Type 5. This is a criss-cross design which runs the length of the shell, on both sides, usually. [5] [Fig. 8, f - flat perspective, j].

Type 6. A double zigzag line with vertical hachure in between. [1] [Half of the other side is Type 3; Fig. 8, h].

Type 7. A series of encircling zigzag bands filled with horizontal hachure. This design is completely around the piece. [2] [Fig. 8, k - flat perspective].

Type 8: A series of acute angles running the length of one side of the shell, and terminating in several horizontal lines. Some of the angles are connected to form a type of zigzag line, the reverse is a series of horizontal dashes forming a zigzag line. [1] [Fig. 8, d].

Type 9. This consists of three bands of four or five rings around the shell. [1] [Fig. 8, e].

Type 10. A variant of the parallel zigzag line design. It is similar to Type 9. [1] [Not illustrated].

ETHNOGRAPHIC DENTALIUM DESIGNS AND USAGE

Comparative ethnographic examples from the Plateau reveal a dearth of examples of incised dentalium. No examination of museum specimens of dentalium on clothing or included in jewelry such as necklaces, bracelets, ear bobs, and nose piercing has been conducted to the author's knowledge. A review of Ray (1942:171–172) in the Culture Element Distributions series reveals its use in occasional nose decoration (far north), frequently in ear bobs but not ear pins (except Tenino and Chilcotin), and almost universally in necklaces (except Kutenai), but no mention of dentalium incising is made. Undecorated dentalium use was common among both Salish and Sahaptian speakers in the Columbia or American Plateau and Salish speakers in the Canadian or Fraser Plateau. Working from north to south and generally from early to late, the following very brief notes were gleaned from the ethnographic evidence regarding dentalium.

In the far north, the Sekani are described by Jenness (1937:32) as receiving dentalium by trade from the Carrier and coastal Gitksan. "They were worn both in the ears and noses."

The work of James A. Teit for Franz Boas and the Jesup North Pacific Expedition of the American Museum of Natural History includes much of the Salish territory. All of Teit's work must begin with his Thompson Indian study (Teit 1900). He mentions and illustrates the use of whole dentalium in women's head bands and for both sexes, necklaces and ear ornaments (Teit 1900:218, 222–223, Figs. 193, 195–196). Nose ornaments worn by women were made of two whole dentalium with "scalps of red-headed woodpeckers... in one or both ends" (Teit 1900:222, Fig. 197).

The Shuswap (Teit 1909:508–510) used dentalium for decorating clothing, ear bobs, necklaces, and ear ornaments (mostly for women) identical to the Thompson. Dentalium beads were common burial goods as among the Thompson (Teit 1909:592).

The Lillooet, like the Shuswap, varied little from the more detailed description of the Thompson in the use of dentalium for ornamenting caps, head bands, shirts, ears, and noses (Teit 1906:220). One important difference is that "dentalium-shells were sometimes notched around the edges or ornamented with incised lines." (Teit 1906:220). The notched form has not been recorded archaeologically nor seen in ethnographic museum collections. This is also the only ethnographic description of incising in the Plateau that was found in this survey.

For the more southerly Salish groups within the United States, Teit (1930) has even more abbreviated descriptions of dentalium use. In addition to ear ornaments, for the Coeur d'Alene he says "nose pins were used by many women and by some men." They were a single large dentalium shell or two shells fitting into each other (Teit 1930:82). Teit (1930:340) clearly states that no nose ornaments or nose pins were used by the Flathead and Pend d'Oreilles, and they were rare among the Kalispel and Spokan. Apparently a nose ornament is through the septum while a nose pin is horizontally through the lip just below the nose.

Among the Sinkaietk or Southern Okanogan (Okanagan—Canadian spelling), dentalium was used on women's dress fringe, as ear ornaments, and for nose pins and nose ornaments (Post and Commons 1938:45, 49; Teit 1930:236). For the Sanpoil and Nespelem, dentalium beads were used but "labrets and nose ornaments were not known" (Ray 1932:50–51). In spite of Ray's comments, the upper Columbia region including San Poil and Nespelem as well as Colville, Lakes, and Spokan territory was surveyed prior to the flooding of Franklin D. Roosevelt Reservoir behind Grand Coulee Dam, and numerous dentalium were found and reported in body locations suggestive of decoration in the head area (Collier, Hudson, and Ford 1942:92–93). Later archaeological research in the area provided further evidence of the use of dentalium as ear and nose ornaments in this portion of the Columbia River.

The Middle Columbia Salish, also known as the Moses-Columbia, are the most briefly described group by Teit (1928:117). Yet in addition to the mention of caps, shirts, and dresses he gives a concise description of the use of shells as follows:

> It seems that the Columbia Salish were noted for having an abundance of shell and other ornaments. Necklaces, pendants, ear-rings, nose-pins, hair-ornaments, and the like, were of shell. Dentalium and other ocean shells were common.

In support of Teit, the rich Pot Holes site is within the ethnographic Middle Columbia territory.

To the south of the Salish speakers, the Sahaptian (Nez Perce and Sahaptan) speakers represent an area of wider archaeological recovery of dentalium than the Salish but with fewer specific ethnographic data. Dress fringes and necklaces of dentalium have been observed on Yakama and Nez Perce museum materials, but none of the shells were incised.

Summarizing the various editions of Lewis and Clark, Sappington (1989:14–15) comes to the conclusion that the

Nez Perce used a single dentalium as a nose decoration. The early ethnographic authority for the Nez Perce, Herbert Spinden (1908:216), mentions only shell beads and no mention of nose ornaments. He does describe the use of dentalium in burials but this appears to be from archaeological observation rather than an ethnographic perspective (Spinden 1908:252). Teit (1930:340), when working with the Coeur d'Alene, noted that the nose ornament among the Nez Perce was "common." This may have been a Coeur d'Alene attempt to denigrate the Nez Perce as "bone-in-the-nose savages." This kind of rivalry between these neighboring tribes is still evident today and surely was when Teit was working there in 1909. A Plateau-wide ethnographic mention of nose decoration with dentalium and moderately frequent personal archaeological observations of one or two dentalium found in the nasal area of individuals buried along the lower Snake River strongly suggest that nose-piercing was a common trait that went out of fashion in the Plateau during the early historic period.

Gunkel (1978:298) describes the use of dentalium as money at Fort Wallawalla, among the Sahaptan speaking Wallawalla and Umatilla plus the Cayuse, but does not mention its use for body and clothing decoration. Stern (1998:413), however, shows dentalium-decorated women's dresses from approximately 1900 for these groups. According to Curtis (1911:159), the Yakama used dentalium ear ornaments and should be included among those who used nose ornaments of dentalium. The Klickitat also practiced nose piercing with "a long taper'd piece of Shell or beed put through the nose" (Moulton 1988[5]:318; Thwaites 1904–1905[3]:144).

Further down the Columbia River, the Wishram are described by Spier and Sapir (1930:207–208) as using dentalium, especially for ear bobs. Nose ornaments are not mentioned but are by Curtis (1911[7]:172) who said "the wearing of dentalium shell in the nasal septum were common to both sexes." Dentalium were especially important among the beads placed on a body at disposal in a burial shed (Spier and Sapir 1930:270).

According to Spier (1930:207), prior to contact, shell was not used on clothing by the Klamath but in the historic period, dentalium was used as an offering on cremations and as nose ornaments, ear ornaments, and necklaces. Ground dentalium was also used by both men and women as an aid to conception among the Klamath (Spier 1930:57, 139).

CONCLUSIONS

In spite of the Wishram being closer to the coast and living at the major trade center of the Plateau and its conjunction with the Northwest Coast, it is interesting that Spier and Sapir (1930:208) state that the source of dentalium for the Wishram is from California through the Klamath. Spier (1930:216) in his discussion of the Klamath questions the reliability of this information on direction of trade. To further confuse the source of trade via the Klamath, he says "Dentalium are not marked with incised designs, as among the Yurok" (Spier 1930:215). The lack of dentalium in the Fort Rock Basin also adds to the absence of strong evidence for trade from California through the Klamath to the Plateau (Largaespada 2006). The conclusion on the likely trade route of dentalium into the Plateau based on the present survey of incised examples tends to agree with Hayden and Schulting (1997:53) for trade along the Columbia and the Thompson and Fraser rivers rather than the earlier conclusion of trade from California. This study, however, shows a clustering of incised dentalium on the middle Columbia and the lower Snake region rather than the Deschutes to Yakima region of Hayden and Schulting (1997:53).

Curtis (1911[8]:72) cites 1845 as the terminal date for all nose ornaments among Salish groups below the Canadian border. The ethnographic evidence lists only one source for incised dentalium in the Plateau, the Lillooet, for whom Teit (1906:220) says, "dentalium-shells were sometimes notched around the edges or ornamented with incised lines." This scant evidence plus the lack of incised dentalium in historic period graves would seem to indicate that by the historic period, the incising of dentalium was largely a forgotten art form in the Plateau Culture Area. The fact that metal did not seem to improve on the stone incising may have played a part in this change.

The middle Snake River burial sites below Asotin and above Palus would seem to indicate a dentalium sequence of late prehistoric trading of segmented shells and a slightly later influx of whole dentalia. Incised designs were exclusively placed on fresh, whole shells. With the missionary influence and the destruction of the trading systems, the use of dentalia sprinkled in burials seems to have been replaced by glass trade beads. Whole dentalium became almost exclusively utilized by women on clothing, mostly dresses, and as ear bobs and necklaces.

The archaeological evidence in general—and especially at Asotin—shows that the dating of dentalium use is not clear and widely distributed over a long time period from the late prehistoric to the present with occasional earlier occurrences. The use of dentalium appears to be more prevalent in sites utilized by native religion practitioners rather than by Christians. The archaeological use of dentalium is virtually limited to burial sites in two distinct ways: 1) the ornamentation of the deceased, and 2) the sprinkling of shells, usually segmented, in burial fill or on

cremation hearths, apparently as offerings. The second use appears to have died out in the historic period, perhaps due to Christian influence or the loss of trade routes and sources. Not surprisingly, the frequency of use tends to be greater in those areas closer to the major trade routes with the notable exception of the Middle Columbia ethnographic region.

Valuable research is still possible on such factors as the distribution of specific design elements in time and space. Research by those trained in the art of the Plateau is also needed. More specific study of trade routes and the chronology of these routes would also be useful. The technology of dentalium engraving has not been studied even at the gross level, let alone microscopically. Since the source of virtually all incised dentalium is from burials, the timing of these suggested studies is urgent if not already past.

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Roderick Sprague
625 North Garfield Street
Moscow, ID 83843-3624
Email: rsprague3@verizon.net